L 47334-66 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) GG/ID
ACC NR: AR6025774 SOURCE CODE: UR/0058/66/000/004/D064/D065

55

AUTHOR: Babin, P. A.; Ivakhnenko, P. S.

TITLE: Investigation of the formation and stability of electron and hole color centers in single crystals of NaCl

SOURCE: Ref. zh. Fizika, Abs. 4D497

REF SOURCE: Tr. Nauch. ob"yedin. fiz.-matem. fak. ped. in-tov Dal'n. Vost., v. 4, 1964, 25-40

TOPIC TAGS: sodium chloride, color center, excitation spectrum, absorption spectrum, x ray irradiation, annealing, optic density

ABSTRACT: A study was made of the excited absorption spectrum of single crystals of NaCl as a function of the x-ray exposure time, the action of additional illumination in the F and M bands on the color centers, the action of annealing at 350 and 475C on the rate of coloring in the F, M. and V bands, and also the dependence of the relative optical density at the maxima of the F, M, F', and V bands on the time of irradiation with F-light. The complicated character of the F band is confirmed. It is shown that the process of optical decay of F centers proceeds in two stages. The V band consists of V_2 and V_3 bands. The band of excited absorption with maximum near 375 nm has na electronic nature. It is proposed that in synthetic crystals the absorption band with maximum near 200 nm, the long-wave fall-off of which is superimposed on the V-band, is a V_5 band. The growth curves of the optical density of the

Card 1/2

L 47334-66

ACC NR: AR6025774

color centers for natural crystals lie higher than those for synthetic crystals, this being apparently due to the larger concentration of vacancies in them during the initial instant. V. Kosikhin. [Translation of abstract]

SUB CODE: 20

Card 2/2 pb

L 47332-66 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AR6025776 SOURCE CODE: UR/0058/66/000/004/D094/D094

62
B

AUTHOR: Babin, P. A.; Ivakhnenko, P. S.

TITLE: On the impurity absorption of the NaCl-Pb phosphor

SOURCE: Ref. zh. Fizika, Abs. 4D726

REF. SOURCE: Tr. Nauchn. Ob"yedin. fiz.-matem. fak. ped. in-tov Dal'n Vost., v. 4, 1964, 57-74

TOPIC TAGS: halide optic material, luminor, x ray irradiation, absorption band, impurity band, electron transition

ABSTRACT: The change in the absorption spectrum as a function of the x-ray exposure time, illumination in the F-band, and heating at temperatures 50 -- 450C with subsequent quenching, was investigated for NaCl-Pb phosphors kept in storage more than three years, with acceptor concentrations 0.04 and 0.2 mol.% in the melt. The 270 and 200 nm absorption bands changed little following exposure to x-rays and illumination in the F-band, and are apparently due to complexes which do not interact with electrons, holes, or vacancies, and possibly with the $PbCl_2$ phase. Comparison with the spectrum of KCl-Pb makes it possible to conclude that the 203.5 and 273 nm bands in NaCl-Pb correspond to an electronic transition in the Pb ion situated at a lattice point. V. Kosikhin. [Translation of abstract]

SUB CODE: 20

Card 1/1 pb

ACC NR: AP7004958 SOURCE CODE: UR/0048/66/030/009/1416/1419

AUTHOR: Parfianovich,I.A.; Ivakhnenko,P.S.; Shuraleva,Ye.I.

ORG: Irkutsk State University (Irkutskiy gosudarstvennyy universitet)

TITLE: Investigation of the roentgenoluminescence, absorption and emission spectra of NaCl:Eu single crystals /Report, Fourteenth All-Union Conference on Luminescence (Crystal Phosphors) held at Riga, 16-23 Sept. 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 9, 1966, 1416-1419

TOPIC TAGS: luminescence, sodium chloride, europium, luminescent crystal, luminescence spectrum, absorption spectrum, x ray irradiation, luminescence center, temperature dependence

ABSTRACT: The authors investigated the luminescence and absorption of NaCl:Eu crystals grown from a melt in order to obtain information concerning the nature and conversion of the luminescence centers. The absorption spectrum of crystals that had been heated to 350° C had peaks at 240, 340, and 370 mμ. Illumination in these bands excited luminescence peaking at 425 mμ. All three of these absorption bands are ascribed to the same type I centers. In annealed crystals there were found centers of a second type (type II), characterized by absorption peaks at 260, 272, and 330 mμ and a broad luminescence spectrum peaking at 455 mμ, which was strongly stimulated by illumination in the 272 mμ band but not by illumination in the 260 mμ band. When the

Card 1/2

ACC NR: AP7004958

specimens were irradiated with x-rays there was first a build-up of the luminescence, then a decline. The decline is ascribed to transformation of the luminescence centers by the x-rays. Induced absorption peaks were found at 272, 312, 410, and 570 mμ. The 272 and 312 mμ induced absorption bands did not appear in annealed crystals and no emission was observed from the induced activator centers in any of the specimens. The roentgenoluminescence intensity exhibited a complex temperature dependence, first decreasing as the temperature was raised above room temperature and then increasing and passing through two maxima at about 150 and 320° C. The 150° maximum was found to be due to increase of the build-up light sum. From the temperature dependence of the absorption spectra it is concluded that the presence of the 320° C maximum is due to conversion of type I centers to type II centers at temperatures between 160 and 260° and their subsequent re-establishment at higher temperatures. Orig. art. has: 8 figures.

SUB CODE: 20 SUBM DATE: none ORIG. REF: 005

Card 2/2

L 62174-65 EPF(c)/EPR/EWP(j)/EWT(m)/T Pc-4/Pr-4/Pa-4 JAJ/WW/WW

ACCESSION NR: AP5014689 UR/0191/65/000/006/0031/0034
678.027.76.01:539.4

AUTHOR: Ivakhnenko, P.Ya.; Lapshin, V.V.; Akutin, M.S.

TITLE: Effect of stretch conditions during vacuum forming on the mechanical properties of articles made of impact polystyrene

SOURCE: Plasticheskiye massy, no. 6, 1965, 31-34

TOPIC TAGS: polystyrene, stretch forming, vacuum forming, impact polymer, polymer mechanical property, polymer orientation

ABSTRACT: SNP impact polystyrene (a typical amorphous polymer) was studied in sheets 2 mm thick. During vacuum forming, the material becomes oriented as a result of the stretching. The extent of the orientation depends on the degree of stretching and temperature. As the latter rises, the mechanical strength in the direction of the orientation declines; at the same time, there is a decrease of the difference in the mechanical properties of parts with different degrees of stretching, and the orientation stresses become equalized, so that the warping tendency of the article is reduced. The greater the degree of stretching of the material in a given direction, the more

Card 1/2

L 62174-65
ACCESSION NR: AP5014689

pronounced the change in mechanical strength as a function of temperature. The strength of the article can be increased considerably relative to the strength of the sheet by forming the latter at the lowest possible temperatures. Orig. art. has: 7 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MT

NO REF SOV: 004 OTHER: 002

Card 2/2

BAGDASAROV, K.N.; KOVALENKO, P.N.; IVAKHNENKO, P.N.

Photocolorimetric determination of nitrites. Izv. vys. ucheb. zav., khim i khim. tekh. 7 no.5:736-741 '64 (MIRA 18:1)

1. Kafedra analiticheskoy khimii Rostovskogo-na-Donu gosudarstvennogo universiteta.

IVAKHNENKO, P.N.; BAGDASAROV, K.N.

Spectrophotometric study of ethacridine diazotization. Apt. delo 14 no.1:38-44 Ja-F '65. (MIRA 18:10)

1. Rostovskiy gosudarstvennyy universitet.

NADIROV, N.K., kand.khim.nauk; BABIN, P.A.; IVAKHNENKO, P.S.

Spectrophotometric analysis of soybean oil clarified with Far East clays of the Pionerak deposit. Masl.-zhir.prom. 29 no.7:16-18 Jl '63. (MIRA 16:9)

1. Khabarovskiy pedagogicheskiy institut.
(Soviet Far-East—Clay) (Soybean oil—Analysis)

ACCESSION NR: AP4041844 S/0139/64/000/003/0017/0022

AUTHORS: Babin, P. A.; Ivakhnenko, P. S.

TITLE: Some features of additional absorption bands in NaCl crystals

SOURCE: IVUZ. Fizika, no. 3, 1964, 17-22

TOPIC TAGS: sodium chloride, color center, absorption band, x ray coloring, line broadening

ABSTRACT: In order to obtain additional data on the properties of color centers, the authors made a simultaneous investigation of the formation and optical decay of electron and hole absorption bands, observed at room temperature in natural NaCl crystals and in crystals grown from a melt. The experiments were made with crystal plates 1 mm thick, excited by cobalt x-radiation (50 kV, 12 mA). The influence of the radiation dose and of the hardness of the radi-

Card 1/5

ACCESSION NR: AP4041844

ation, as well as of the F and M light, on the spectrum of the additional absorption was investigated. The behavior of each of the three bands of this spectrum (hole band V, electron bands F and M) as a function of the duration of exposure to x-rays was investigated. An increase in the x-ray dose caused the maximum of the V band to shift towards shorter wavelengths in both types of crystals. The position of the maximum of the F band and its half-width varied with increasing x-ray exposure time. The width increased by approximately 0.04 eV and the maximum shifted by approximately 1--2 millimicrons towards the shorter wavelengths. The variation in the x-ray tube voltage displayed no change in the positions of the maxima and the half-widths. Tests of the behavior of the spectrum of the additional absorption under the influence of F and M light (separated by means of a spectrophotometer) were also made and curves plotted for the optical decay of F and M centers. The tests have shown that the M centers are more stable in natural crystals than in artificial ones. The tests have also confirmed that the decay of F center is

ACCESSION NR: AP4041844

a complex process consisting of two stages, the transformation of the F centers into other electron centers and repeated localization of the electrons. "We are grateful to Professor Doctor of Physico-mathematical Sciences I. A. Parfianovich and Candidate of Physico-mathematical Sciences Ye. I. Shuraleva for suggesting the topic and for guidance of the work." Orig. art. has: 5 figures.

ASSOCIATION: Khabarovskiy pedinstitut (Khabarovsk Pedagogical Institute)

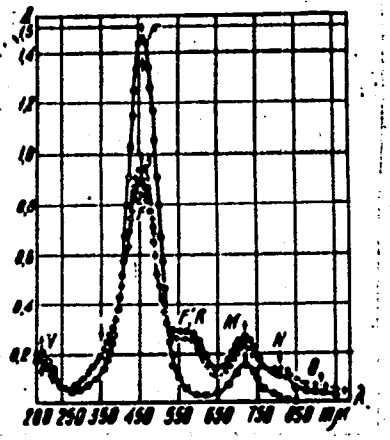
SUBMITTED: 26Nov62 ENCL: 02

SUB CODE: OP NR REF SOV: 003 OTHER: 007

Card 3/5

ACCESSION NR: AP4041844

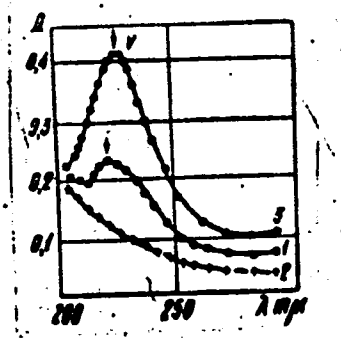
ENCLOSURE: 01



Additional-absorption spectra of natural NaCl crystal: 1 - immediately after x-ray exposure, 2 - after illumination in F-band, 3 - after subsequent illumination of the crystal with M light.

Card 4/5

ACCESSION NR: AP4041844 ENCLOSURE: 02



Additional-absorption spectra of artificial crystal in ultraviolet light: 1 - immediately after x-ray exposure of un-annealed crystal, 2 - after subsequent discoloration in F band, 3 - after x-ray exposure of annealed crystal

5/5

Card

BABIN, P.A.; IVAKHNENKO, P.S.

Some characteristics of complementary absorption bands in NaCl crystals. Izv. vys. ucheb. zav.; fiz. no. 3:17-22 '64.
(MIRA 17:9)

1. Khabarovskiy pedagogicheskiy institut.

L 05767-67 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/JG/GG

ACC NR: AR6031868 SOURCE CODE: UR/0058/66/000/006/D085/D085

65
B

AUTHOR: Ivakhnenko, P. S.; Babin, P. A.

TITLE: Problem of formation and stability of induced centers in a phosphor of NaCl—Ag

SOURCE: Ref. zh. Fizika, Abs. 6D692

REF SOURCE: Tr. Nauchn. ob"yedin. fiz.-matem. fak. ped. in-tov Dal'n. Vost., v. 4, 1964, 41-56

TOPIC TAGS: phosphor, sodium chloride, silver, crystal absorption, thermal stability, absorption band, luminescence

ABSTRACT: The authors investigated the spectral changes in the activated and excited absorptions of NaCl:Ag crystals (concentration of Ag is 0.04 and 1 mol % in the melt) as a function of the x-radiation time and the effects of optical (luminescence in F- and B-bands) and thermal factors (heating of the sample within the 75—300C range). The following conclusions are drawn. The B (275 mμ) and C (305 mμ) bands have an electron nature. The increase in the growth rate of the number of C-centers during the x-radiation with the concentration growth of the

Card 1/2

ACC NR: AR6031868

activator indicates that the C-centers are dependent on the ion pair of Ag. The thermal and optical stabilities of induced absorption bands depend on the concentration of the activator, whereupon with the growth of concentration, the stability increases in C- and D-centers and decreases in B-centers. The x-rays exert luminescence stimulation on the B-band. V. Kosikhin. [Translation of abstract]

SUB CODE: 20/

PARFIANOVICH, I.A.; SHURALEVA, Ye.I.; BABIN, P.A.; IVAKHNENKO, P.S.

Activator absorption of NaCl - Pb and KCl - Pb phosphors. Izv. AN SSSR. Ser.fiz. 29 no.3:417-419 Mr '65.

Some data on the properties of induced activator centers in NaCl - Ag and KCl - Ag phosphors. Ibid.:427-430 (MIRA 18:4)

1. Irkutskiy gosudarstvennyy universitet i Khabarovskiy gosudarstvennyy pedagogicheskiy institut.

POLTORATSKIY,T.S., inzhener; IVAKHNENKO,P.V., inzhener

Circular machine for the production of shavings from veneering wastes. Der.prom.4 no.6:24-25 Je '55. (MLRA 8:10)

1. Trest Latfanspichprom
(Woodworking machinery) (Wood waste)

LIPKIND, G.I.; IVAKHENKO, P.V.; KOGAN, Z.B.

Mechanization in the sector of veneering pencils. Der.prom. 6 no.1: 21-22 Ja '57. (MLRA 10:2)

1. Fanernyy zavod "Furniyers."
(Pencils)

IVAKHNENKO, P.V.; POZDNIKOV, V.N.

Over-all mechanization of the processes of carbamide resin manufacture. Der. prom. 10 no.7:9-11 Jl '61. (MIRA 14:7)

1. Rizhskiy fanernyy zavod "Lignums" (for Ivakhnenko). 2. Institut fiziki Akademii nauk Latviyskoy SSR (for Pozdnikov).
(Latvia—Resins, Synthetic)
(Radioisotopes—Industrial applications)

24748

15 8420

S/191/61/000/007/006/010
B101/B215

AUTHORS: Lapshin, V. V., Ivakhnenko, P. Ya.

TITLE: Vacuum molding of thermoplastic materials

PERIODICAL: Plasticheskiye massy, no. 7, 1961, 22-26

TEXT: Practical data are given on the well-known vacuum molding of thermoplastic materials. This process is recommended for use in: 1) the manufacture of large-size products, since the size is only limited by that of the plastic sheet; 2) the manufacture of color-printed products. Before molding the design is printed onto the sheet. Other advantages: 3) easier manufacture of molds; 4) less expensive equipment. A) Negative molding: The plastic sheet is drawn into the mold by the vacuum and applied to the mold faces. The bottom of the finished product is thinner than its walls. As to polystyrene 2.1 mm thick, the thickness given for a box of 160·270 mm and a depth of 160 mm is such: center of bottom: 0.3 mm; edges: 1.5 mm. If the external faces and dimensions are to be more accurate, negative molding is recommended. The maximum ratio between the depth H and the shortest lateral edge B is $H \leq 0.5B$. B) Positive molding: The mold is

Card 1/3

Vacuum molding of thermoplastic materials

hydraulically pressed into the plastic sheet, and the plastic is applied to the mold by sucking off the air. In this case, the wall thickness of the finished product is smaller along the sides (0.7 mm) than at the bottom (1.3 mm). This method is to be preferred for more accurate internal faces and dimensions. C) The mold may be made of metal, wood, gypsum, or plastics (epoxy resins). For mass production, only molds of metal or resin-impregnated laminated cloth (Textolite) can be used. Data are given on the diameter of the suction openings (maximum: half the thickness of the sheet, since otherwise the openings would appear on the plastic) and on their closer arrangement in corners and on edges where precise molding is necessary. Dead zones from which no air is sucked off are to be eliminated. The molds can be heated or cooled from inside. The following materials are recommended for vacuum molding: viniplast (I), polymethyl methacrylate (II), and polystyrene (III). Molding is conducted in highly elastic state. The following physico-mechanical data are given: tensile strength (kg/cm^2): I: 400-600; II: 400-600; III: 400. Relative breaking elongation (%): I: 10-25; II: 3; III: 12. Impact strength ($kg \cdot cm/cm^2$): I: 120; II: 7-12; III: 45. Brinell hardness (kg/mm^2): I: 15; II: 13; III: 12. Heat resistance according to Vicat: I: 86; II: 92; III:

24748

S/191/61/000/007/006/010
B101/B215

Vacuum molding of thermoplastic materials

94-98. Impact-resistant polystyrene СНП (SNP) is suited for deep and shallow molds; temperature of molding: 100-140°C; in polished sheets not more than 110°C, since otherwise the polish would disappear. Polymethyl methacrylate is molded at 130-150°C but requires previous heating and stretching. The finished product should be cooled in the mold to avoid distortions by shrinkage. Viniplast can only be used for shallow molds. Temperature: 95-130°C. If the molds are too deep, separation into layers would occur with this laminated material. There are 5 figures, 1 table, and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

Card 3/3

IVAKHNENKO, P.Ya.; LAPSHIN, V.V.; AKULIN, M.S.

Effect of extrusion conditions in vacuum molding on the mechanical properties of goods made from impact-resistant polystyrene. Plast. massy no.6:31-34 '65. (MIRA 18:8)

IVAKHNENKO, S.D.; KHOMENKO, V.S.

Optical determination of the fractional composition of sediments.
Trudy OGMI no.20:47-48 '59. (MIRA 14:10)
(Sedimentation and deposition)

IVAKHNIN, I. I.: Master Phys-Math Sci (diss) -- "Some problems of the stability of conic membranes". Dnepropetrovsk, 1958, published by the Zaporozh'ye Oblast publishing house. 7 pp (Min Higher Educ Ukr SSR, Dnepropetrovsk State U im 300th Anniversary of the Unification of the Ukraine with Russia), 200 copies (KL, No 8, 1959, 134)

AUTHOR: Ivakhnin, I.I.

SOV-21-58-4-5/29

TITLE: Stability of a Conic Shell of Circular Cross Section under the Simultaneous Action of Axial Compression and Normal External Pressure(Ustoychivost' konicheskoy obolochki krugovogo secheniya pri sovmestnom deystvii osevogo szhatiya i vneshnego normal'nogo davleniya)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1958, Nr 4, pp 376-380 (USSR)

ABSTRACT: The problem of stability of conic shells subjected to uniform all-round pressure was considered in references 1 to 5. Their stability under the combined action of external normal pressure and axial compression was analyzed by Kh.M. Mushtari and A.V. Sachenkov [Ref. 6], but the results obtained by them are very complicated and unsuitable for practical computations. This problem is treated by the author by using the Ritz method and introducing some simplifications. He derives a formula for the critical load

Card 1/2

Stability of a Conic Shell of Circular Cross Section under the Simultaneous Action of Axial Compression and Normal External Pressure

at the uniform external pressure, which can be applied in numerical computations. This formula is reduced, in a case of cylindrical shell, to a known formula of Timoshenko /Ref. 1/. There are 7 Soviet references.

ASSOCIATION: Dnepropetrovskiy gosudarstvennyy universitet (Dnepropetrovsk State University)

PRESENTED: By Member of the AS UkrSSR, G.N. Savin

SUBMITTED: June 13, 1957

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

1. Conical shells--Stability 2. Conical shells--Mathematical analysis

MATSEYCHIK, V.I.; IVAKHNIN, I.I.

Stability of long twisted rods under thermal stress. Izv.AN Arm. SSR. Ser.fiz.-mat.nauk 17 no.3:141-144 '64. (MIRA 17:9)

1. Zaporozhskiy mashinostroitel'nyy institut imeni V.Ya.Chubarya.

IVAKHNO, G.I.

Unusual foreign body in the ear. Vest.oto-rin. 18 no.5:110 S-O '56.
(MLRA 9:11)

1. Iz oto-laringologicheskogo otdeleniya Cherkasskoy oblastnoy bol'nitsy.
(EAR--FOREIGN BODIES)

IVAKHNO, G.I.

Characteristics of otorhinolaryngological diseases in two districts of Kiev in 1957. Zhur. ush., nos. i gorl. bol. 20 no. 3:56-58 My-Je '60. (MIRA 14:4)

1. Iz kafedry organizatsii zdravookhraneniya (zav. - prof. Z.A. Gurevich) Khar'kovskogo meditsinskogo instituta i Ukrainskogo nauchno-issledovatel'skogo byuro sanitarnoy statistiki Ministerstva zdravookhraneniya USSR (zav. - P.P. Grabovskiy).
(KIEV—OTOLARYNGOLOGY)

BUDNIKOV, P.P.; akademik; IVAKHNO, M.V., inzh.

Airtightness of binding materials based on lime and mineral additives. Stroi.mat. 7 no.5:32-34 My '61. (MIRA 14:6)

1. Akademiya nauk USSR, chlen-korrespondent AN SSSR (for Budnikov).
(Binding materials)

IVAKHNO, N. V.

27782. FAL'KOV, I. A., BUTT, YU. M. i IVAKHNO, N. V. — Vyazhushchiy material iz ochazhnykh ostatkov kol'tsevykh pechey. Mest. Stroit. Materialy, 1948 Vyp. 9, S. 21-26.

SO: Letopis' Zhurnal'nykh Statey, Vol. 37, 1949

IVAKHNO, N.V., inzh.

Local binding materials based on ash from the Syzran' Thermal Electric Plant and unslaked lime. Shortrud.ROSNIIMS no.19: 24-35 '61. (MIRA 16:1)

(Binding materials)

ZAYDENBERG, B.S., kand.tekhn.nauk; ZIL'BERFARB, P.M., inzh.; IVAKHNO, N.V., inzh.

Using local binding materials in the manufacture of keramzit-concrete products. Sbor. trud. ROSNIIMS no.20:98-107 '61. (MIRA 16:1)

(Binding materials) (Concrete products) (Keramzit)

ACCESSION NR: AP4041716 S/0181/64/006/007/2094/2099

AUTHORS: Ivakhno, V. N.; Nasledov, D. N.

TITLE: Dependence of the quantum yield on the photon energy for p-n junctions in InSb

SOURCE: Fizika tverdogo tela, v. 6, no. 7, 1964, 2094-2099

TOPIC TAGS: quantum yield, indium antimonate, pn junction, photon energy, conduction band

ABSTRACT: In view of the fact that earlier investigations of the energy dependence of the quantum yield of ImSb (J. Tauc, J. Phys. Chem. Solids, v. 8, 219, 1959) were interpreted under the assumption that there are several conduction bands in InSb, the authors investigated the quantum yield in the region of 1--6 microns near the temperature of liquid nitrogen, with a resolution not exceeding 200 A. The measurements were made on electron-hole junctions at T = 100K.

Card 1/4

ACCESSION NR: AP4041714

The measurements have disclosed several sharply pronounced maxima. The use of an optical system with high resolution (not exceeding 200 A) made it possible to calibrate the radiation source energy with higher accuracy ($\Delta h\nu < 5\%$), so that several maxima previously not observed were seen on the quantum yield vs. energy curve. The quantum yield begins to increase for photons with energy ≥ 0.42 eV. The position of the maxima on the energy scale is very close to the values corresponding to the thresholds of impact ionization calculated on the basis of the band structure proposed by E. O. Kane (J. Phys. Chem. Solids v. 1, 249, 1957) for InSb. The results thus favor Kane's theory, and also offer evidence in the correctness of the impact ionization probabilities, calculated by A. R. Beattie on the basis of Kane's theory (J. Phys. Chem. Solids, v. 24, 1049, 1962). A maximum on the quantum yield $h\nu = 0.9$ eV, and can be related to transitions from the zone that is split off as the result of spin-orbit interaction. A sharp minimum was also observed at $h\nu = 0.354$ eV, which goes over directly into a maximum at $h\nu = 0.365$. The reason

Card 2/4

ACCESSION NR: AP4041714

for these extremal points on the quantum yield curve is still unexplained. Orig. art. has: 4 figures, 2 formulas, and 2 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute, AN SSSR)

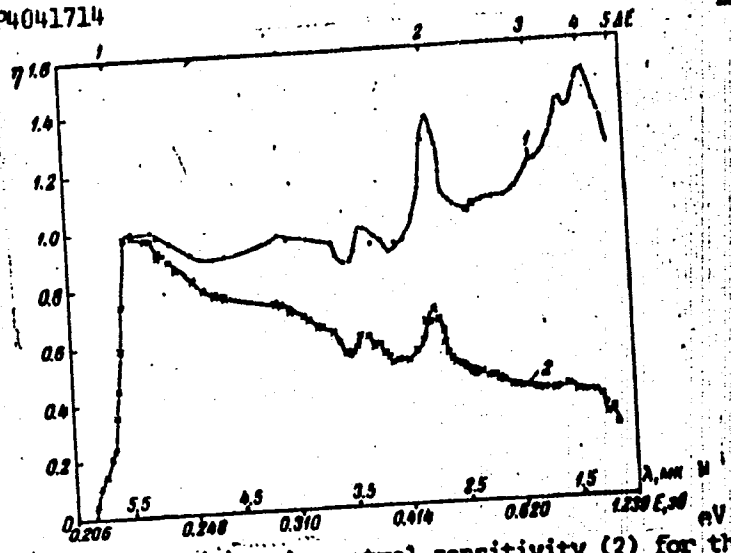
SUBMITTED: 28Dec63 ENCL: 01

SUB CODE: NP, SS NR REF SOV: 000 OTHER: 008

Card 3/4

ENCLOSURE: 01

ACCESSION NR: AP4041714



Quantum yield vs. photon energy (1) and spectral sensitivity (2) for the p-n junction of one sample of InSb

Card 4/4

L 11134-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/AT

ACC NR: AP6000873 SOURCE CODE: UR/0181/65/007/012/3650/3652

AUTHORS: Ivakhno, V. N.; Izvozchikov, B. V.; Taksami, I. A.

ORG: Physicotechnical Institute im. A. F. Ioffe AN SSSR Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Effect of pressure on the spectral distribution of the photoeffect in InSb

SOURCE: Fizika tverdogo tela, v. 7, no. 12, 1965, 3650-3652

TOPIC TAGS: indium compound, antimonide, pressure effect, photoeffect, spectral distribution, pn junction, forbidden band

ABSTRACT: Inasmuch as earlier investigations of the pressure effect on indium antimonide were limited to electric measurements, the authors have investigated the spectral sensitivity of indium antimonide under static pressure by photoelectric means. The pressure ranged from zero 8,000 kg/cm^2. The temperature was 96K. The samples were cubes measuring 1 x 1 x mm. A p-n junction was placed on the irradi-

Card 1/2

ACC NR: AP6000873

ated surface, parallel to it, at a depth 10--20 μ, which was irradiated through the hole region in which the free-hole density was $P \leq 1 \times 10^{15}$ cm^{-3}. The electronic part had a density $n = 1.2 \times 10^{15}$ cm^{-3}. The spectral characteristics were measured with a spectrograph (ZMR-2). The values of the 'red boundary' as a function of the pressure are listed for certain fixed pressure, as well as the corresponding widths of the forbidden band. The variation of the widths of the forbidden band with the static pressure was found to be independent of the pressure at an average value 14.8×10^{-6} ev/atm. This agrees well with results obtained by electric measurements. The gap itself increases linearly with the applied pressure. The photoresponse has the same wavelength dependence for all pressures. It is concluded that pressure makes transitions to the lowest levels in indium antimonide forbidden, i.e., the pressure influences primarily the levels with minimum energies, and the bands at higher energies change little in the investigated pressure range. Authors thank D. N. Nasledov and B. T. Kolomiyets for interest in the work. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 24Jun65/ OTH REF: 003

IVAKHNYUK, L.I.

Practice in the operation of condensate collection and return systems in a coke chemical plant. Prom.energ. 16 no.6:29-30 Je '61. (MIRA 15:1)

(Steam pipes) (Chemical plants--Heating and ventilation)

IVAKHNYUK, V.A., inzh.; MUSATOV, I.G., inzh.; GRINMAN, M.M., inzh. LOBOYKO, V.N., inzh.; PETRENKO, N.P., inzh.; KONDRASHOV, A.A., inzh.

Precast and monolithic caissons in the building for the initial crushing of ore. Prom. stroi. 42 no. 6:15-17 '65. (MIRA 18:12)

1. Belgorodskiy otdel instituta Khar'kovskiy Promstroyniiproyekt (for all except Kondrashov). 2. Trest "KMArudstroy" (for Kondrashov).

IVAKHOV, A.; NUDEL', I.

Chamber dryer for fire departments. Pozh. delo 6 no. 11:29 N '60.
(MIRA 13:12)

1. Nachal'nik Otdela pozharnoy okhrany Vinnitskogo oblispolkoma (for Ivakhov). 2. Starshiy inspektor Otdela pozharnoy okhrany Vinnitskogo oblispolkoma (for Nudel').
(Fire departments--Equipment and supplies)

IVAHOV, I. F.
IVAKHOV, I.I.

PA 20/49T60

USSR/Engineering Sep 48
Generators, Diesel
Governors

"Parallel Operations of Diesel Generators With Isochronous Governors," I. I. Ivahov, Min of Transp, 6 pp

"Energet Byul" No 9

General discussion of subject concludes that when running Diesel generators with isochronous governors in parallel, it is desirable to cope with load fluctuations using one set only.

[redacted] 20/49T60

IVAKHOV, V.N.

Peat therapy in the district hospital. Sovet. med. 19 no.5: 56-60 My '55. (MLRA 8:8)

1. Iz Kurovskoy uchastkovoy bol'nitsy Sverdlovskoy oblasti.
(MUD THERAPY,
peat in Russia)

IVAKIC, S.; KOKALOVIC, M.

"An artillery field glass as a teleobjective and as an auxiliary instrument for stereophotography."

p. 816 (Vojno-Tehnicki Glasnik) Vol. 5, no. 11, Nov. 1957
Belgrade, Yugoslavia

SO: Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 4, April 1958

SHAROVA, A.K.; DEMENEV, N.V.; FOTIYEV, A.A.; IVAKIN, A.A.

Preparing titanium dioxide from an ilmenite concentrate by smelting with sodium sulfate. Titan i ego splavy no.4:95-101 '60.
(MIRA 13:11)

(Ilmenite) (Thermochemistry)

S/598/60/000/004/010/020
D217/D302

AUTHORS: Sharova, A.K., Demenev, N.V., Fotiyev, A.A. and Ivakin, A.A.

TITLE: Production of titanium dioxide from ilmenite concentrates by sodium sulphate melting

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. No. 4. Moscow, 1960. Metallurgiya titana, 95-101

TEXT: In all experiments, ilmenite concentrate from the Irshinsk deposits, of 0.056 mm mesh size were used. The chemical composition of the concentrate was as follows: 51.46% TiO_2, 33.78% Fe, 1.04% Al_2O_3, 1.56% SiO_2, 0.86% MgO, 0.26% V_2O_5, 0.42% MnO and traces of CaO. Wood charcoal with an ash content of approximately 2% and 0.4 mm mesh size was used as the reducing agent. The main reagent, Na_2SO_4, is a natural product.

The charges of ilmenite concentrate, Na_2SO_4 and wood charcoal were

Production of titanium ...

thoroughly mixed and transferred to porcelain or graphite crucibles. Charges weighing 200-300 grams were used for the experiments. The mixtures were melted in a silite furnace. It was assumed that the melting was complete at the moment when gases ceased to be evolved from the melt. Each crucible was then withdrawn from the furnace and the melt cast in a graphite mould. After cooling, the melt was ground and subjected to leaching with water and acid. The residue was calcined and analyzed for its iron and titanium dioxide content. When ilmenite concentrates are melted with Na_2SO_4, the following reaction occurs: $FeTiO_3 + Na_2SO_4 + 2C = FeS + Na_2TiO_3 + 2CO_2$. The reaction intensity depends among other factors on the method of melting and the surface area of contact of the various phases. In order to find the conditions under which maximum extraction of iron in aqueous leaching is attained, the following factors were studied: Volume ratio between solid and liquid, time of stirring, temperature of leaching and degree of grinding of the melts. In all experiments, leaching was carried out at 25°C for 15 minutes. The

Production of titanium ...

particle size of the melt was 1.6-0.85 mm. It was found that complete extraction of iron from the melt can be attained only when the sodium sulphate and carbon contents in the charge are sufficiently high. The optimum ratio between concentrate, sodium sulphate and wood charcoal in the charge (in parts-by-weight) is 1:2:0.6. At 1000-1050°C, complete decomposition of the ilmenite concentrate occurs (up to 98 or 99%). No melting of the charge occurs up to 900°C. At higher temperatures, intense melting occurs with much evolution of gas and a homogeneous fluid melt is formed. Extraction of iron sulphide into the solution depends on the time of leaching and the degree of grinding of the melt. An increase in the time of leaching from 15 to 60-90 minutes decreases the amount of iron extracted into the solution owing to the transformation of the sulphide from a soluble form into a gel. The optimum conditions for extracting iron sulphide in the aqueous solution (up to 80 or 85%) are as follows: ratio solid: liquid = 1:10, solution temperature = 70-80°C, degree of comminution of the melt = 2-3 mm and time of leaching = 15-20 minutes. As a result of treating the residue, titanium dioxide

Card 3/4

Production of titanium ...

is obtained in a form suitable for metallurgical purposes and for producing titanium tetrachloride. There are 5 figures, 1 table and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.C. Witt, Am. Chem. Soc., 43, no. 4, 734, 1921.

Card 4/4

S/200/62/000/001/003/004
D204/D302

AUTHOR: Ivakin, A.A.

TITLE: Thermal decomposition of certain lanthanon sulphates

PERIODICAL: Akademiya nauk SSSR. Sibirskoye otdeleniye. Izvestiya, no. 1, 1962, 49 - 54

TEXT: Kinetics of the thermal decomposition of $M(SO_4)_3$ where M = La, Nd, Pr, Sm, Eu, Gd, Yb and Y were studied, under O-free dry N_2, since little work has been done in this field. The decomposition was assessed by the weight-change method. Preliminary experiments showed that initial dissociation occurred at ~700°C, but only $(MO)_2SO_4 + SO_2 + O_2$ were formed below 1000°C. Sulphate decomposition was therefore, investigated between 950 - 1050°C and the oxysulphates were decomposed at 1300°C. It was found that the stability of the oxysulphates decreased steadily with the atomic number of the lanthanon, whilst the stability of the sulphates fell in the series: La, Nd, Pr, Sm, Eu and increased again in the order: Eu, Gd, Yb, Y.

Card 1/2

The degree of decomposition of the oxysulphates, x, after t minutes is given by $x = kt^n$ where k and n are constants. Log t/log x plots were linear, n varying between 1.0 for La and 0.77 for $(EuO)_2SO_4$.

Decompositon of the sulphates was governed by $kt = (1 - \sqrt[3]{1 - x}) = A$. Plots of A against t consisted of 2 linear portions, the slope of each line increasing at about A = 0.3. This suggested that the dissociation proceeded with the formation of intermediate products. X-ray investigations of sulphates heated at 950°C for various periods of time showed that these intermediates were probably solid solutions, i.e. SO_3-rich oxysulphates. A fuller treatment of this problem is thought advisable. There are 5 figures and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The reference to the English-language publication reads as follows: H.H. Willard and R.D. Fowler J.Amer.Chem.Soc., 54, 496, 1932.

ASSOCIATION: Ural'skiy filial AN SSSR, Sverdlovsk (The Urals Branch of the AS USSR, Sverdlovsk)

SUBMITTED: March 20, 1961

IVAKIN, A.A.

Hydrolytic precipitation of vanadium. Zhur. prikl. khim. 36 no.9:1894-1898 D '63. (MIRA 17:1)

IVAKIN, A.A.

Change of the concentration of hydrogen ions in the hydrolytic precipitation of vanadium. Zhur. prikl. khim. 36 no.10:2121-2127 O '63. (MIRA 17:1)

S/080/62/035/002/002/022
D204/D302

AUTHOR: Ivakin, A. A.

TITLE: Interaction of cerium with hypochlorites

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 2, 1962, 245-250

TEXT: A brief review is first given of the interactions of Ce with hypochlorites, quoting Soviet and Western works, including those of I. Ye. Flis and M. K. Bynyayeva (Ref. 6: Tr. LTI, 4, (1956); Ref. 7: ZhPKh, 31, 1194, (1958)). The various equilibria occurring in hypochlorite solutions are described and illustrated. In the present work the author studied the interaction of $CeCl_3$ prepared from pure oxide, and NaOCl solutions of various pH. A series of potentiometric titrations was first carried out, between 0.0586M aq. $CeCl_3$ and NaOCl solutions, with and without free alkali. The results are given graphically. In further work various quantities of water and hypochlorite solutions were added to 50 ml of 0.0586M $CeCl_3$, to a total vol. of 100 ml. The solutions were brought to

Card 1/3

equilibrium, at 20°C, and the active chlorine and pH of the filtrate were then measured whilst the precipitate was analyzed for Ce. It was found that the pH increased sharply from ~2.5 to ~5 at $NaOCl:CeCl_3$ ratios of 0.4 - 0.45 to 1. Free HOCl was present. The author suggests that in the presence of free alkali $2Ce^{3+} + OCl^- + 6OH^- + H_2O = 2Ce(OH)_4 + Cl^-$, while the interaction of pure hypochlorite and $CeCl_3$ is: $2Ce^{3+} + 7OCl^- + 7\ H_2O = 2Ce(OH)_4 + 6HOCl + Cl^-$. The results are discussed. These reactions agree with the observed pH (4 - 5), but do not explain all the experimental findings, such as the minima on the titration curves and the linear relationship between the amount of NaOCl added and the amount of cerium precipitated, at $NaOCl:CeCl_3$ ratios $>0.4:1$. Additional interactions carried out in closed systems to allow determination of hypochlorite consumed by the various processes showed that unstable hypochlorites of unknown composition were formed and partially dissociated during the oxidation and precipitation reaction. Further

study of these compounds is thought advisable. There are 7 figures and 8 references: 4 Soviet-bloc and 4 non-Soviet-bloc. The references to the English language publications read as follows: R. C. Vickery, J. Soc. Chem. Ind., 67, 333, (1948); ibid., 69, 122, (1950).

SUBMITTED: March 20, 1961

Card 3/3

GLAZYRIN, M.P.; IVAKIN, A.A.

Crystallographic and optical characteristics of vanadates of some rare earth elements. Kristallografiia 9 no.6:927-928 N-D '64. (MIRA 18:2)

1. Institut khimii Ural'skogo filiala AN SSSR.

L 1717-66 EPF(c)/EWT(m)/EWP(b)/T/EWP(w)/EWP(t) IJP(c) JD/JG

ACCESSION NR: AP5021944 UR/0126/65/020/002/0308/0309
539.292:538.114

AUTHOR: Samokhvalov, A. A.; Bamburov, V. G.; Volkenshteyn, N. V.; Zotov, T. D.; Ivakin, A. A.; Morozov, Yu. N.; Simonova, M. I.

TITLE: Magnetic properties of Eu_3O_4

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 2, 1965, 308-309

TOPIC TAGS: magnetization, saturation magnetization, temperature dependence, Curie temperature, Weiss-Forrer method, magnetic moment, europium compound

ABSTRACT: To elucidate the magnetic properties of Eu_3O_4 the authors measured the temperature dependence of magnetization in the presence of different magnetizing fields at temperatures of upward of 1.65°K and thus determined for the first time the principal magnetic characteristics of Eu_3O_4: saturation magnetization σ_s and Curie temperature T_C. The measurements were performed with the aid of a pendulum magnetometer. The external magnetic field in the measurements reached 17,300 oe, which sufficed to bring the specimen to magnetic saturation. Through extrapolation from the set of curves $\sigma(H, T)$ to $H = \infty$ the saturation magnetization σ_s was found

Card 1/2

L 1717-66

ACCESSION NR: AP5021944

to be 89.4 gauss·cm^3/g. From the same curves, using the Weiss-Forrer method of lines of equal magnetization, the authors found the Curie temperature, which proved to be 7.8°K. With its relatively large magnetic moment and low Curie point, this oxide appears a suitable means of verifying the spin-wave theory. Verification of this theory showed that the linear T^2-dependence of saturation magnetization exists throughout a broad temperature range (from 1.65 to 4.6°K) (0.6 T_c). The same dependence is also observed for a number of uncompensated antiferromagnetics and for certain rare earths. Orig. art. has: 1 figure.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Metal Physics, AN SSSR)

SUBMITTED: 20Oct64 ENCL: 01 SUB CODE: IC, EM

NO REF SOV: 000 OTHER: 004

Card 2/2

L 00425-67 EWT(d)/EWT(l)/EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/WW/JG

ACC NR: AP6026700 SOURCE CODE: UR/0181/66/008/008/2450/2454

AUTHOR: Samokhvalov, A. A.; Bamburov, V. G.; Volkenshteyn, N. V.; Zotov, T. D.; Ivakin, A. A.; Morozov, Yu. N.; Simonova, M. I.

ORG: Institute of Metal Physics, AN SSSR, Sverdlovsk (Institut fiziki metallov AN SSSR)

TITLE: Magnetic properties of EuO at low temperatures

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2450-2454

TOPIC TAGS: europium compound, spontaneous magnetization, magnetic susceptibility

ABSTRACT: EuO was prepared by the solid-state reaction $Eu_2O_3 + C \rightarrow 2EuO + CO$, and its magnetization curves were plotted for 4.2, 20.4 and 82°K. The temperature dependence of spontaneous magnetization was measured at 1.7°K and above, and was analyzed from the standpoint of the spin-wave theory. At 4.2 and 20°K, the magnetization reaches saturation in fields slightly above 4000 Oe. The paramagnetic Curie point and the effective magnetic moment, both determined from the temperature dependence of the magnetic susceptibility, were found to be 75°K and 7.3 μ_B respectively. The exchange integral I was calculated from the low-temperature range ($T < T_c/2$) and found to be equal to 0.394k. It is shown that when the term with $T^{5/2}$ is taken into account in Bloch's law, the range of applicability of Bloch's law expands, but the value of coefficient C_1 at $T^{5/2}$, determined experimentally and giving the best agreement with the experi-

Card 1/2

L 06425-67

ACC NR: AP6026700

mental spontaneous magnetization curve, differs markedly from the calculated value. Orig. art. has: 4 figures, 1 table and 3 formulas.

SUB CODE: 20/ SUBM DATE: 10Nov65/ ORIG REF: 002/ OTH REF: 005

Card 2/2

L 07116-67 EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6029115 SOURCE CODE: UR/0048/66/030/006/0984/0989

AUTHOR: Amokhvalov, A.A.; Ivakin, A.A.; Morozov,Yu.N.; Simonova, M.I.; Bamburov,V.G.; Volkenshteyn,N.V.; Zotov,T.D.

ORG: none

TITLE: Magnetic, high frequency, and electric properties of some oxide compounds of divalent europium /Report, All-Union Conference on the Physics of Ferro- and Anti-ferromagnetism held 2-7 July 1965 in Sverdlovsk/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 6, 1966, 984-989

TOPIC TAGS: ferromagnetism, dielectric constant, dielectric loss, magnetization, temperature dependence, europium compound, oxide, aluminate, silicate, ELECTRIC PROPERTY, MAGNETIC PROPERTY

ABSTRACT: The authors have synthesized EuO, Eu_3O_4, $Eu_3Al_2O_6$, $EuAl_2O_4$, Eu_2SiO_4, and two series of solid solutions containing EuO and CaO, or EuO, CaO, and Eu_2O_3, and have investigated their magnetic and electric properties. The investigation was undertaken because the high magnetization of divalent europium compounds make them of interest in connection with technical applications and the simple crystal structure of EuO makes it a suitable material with which to compare the predictions of theories of ferromagnetism. The magnetization measurements were made with a Domenikali type pendulum magnetometer in fields up to 19 kOe and at temperatures down to 1.6° K. The ferro- and paramagnetic resonance of EuO was investigated at 9 and 35.7 kMHz down to 4.2°K,

Card 1/2

ACC NR: AP6029115

and of the other materials, at room temperature. The dc electrical properties of the materials were investigated and their ultrahigh frequency complex dielectric constants were measured with a resonant cavity technique. Some of the measurement results are presented graphically and others are discussed briefly. The saturation magnetization of EuO, extrapolated to infinite field and 0° K, was found to be 232 Gs cm^3/g. The saturation magnetization of Eu_3O_4 was approximately one-third that of EuO, indicating that the ferromagnetic properties of Eu_3O_4 are due to the divalent Eu ion. The low temperature spontaneous magnetization of EuO was a linear function of $T^{3/2}$, and not of T^2, whereas that of Eu_3O_4 and of the solid solutions containing it was a linear function of T^2, and not of $T^{3/2}$. The aluminates and silicate had a g factor (determined by paramagnetic resonance) of 2, as did EuO, and their spontaneous magnetizations followed the $T^{3/2}$ law. The ultrahigh frequency conductivity of EuO was found to be approximately 5×10^{-3} ohm^{-1} cm^{-1}, which is some six orders of magnitude higher than the dc conductivity. It is suggested that the same ultrahigh frequency dielectric loss mechanism is active in EuO as in the 3d transition metals. Other results than those listed above are presented. The authors thank S.V.Vonsovskiy for his interest and advice. Orig. art. has: 4 figures and 2 tables.

SUB CODE: 20 SUBM DATE: 00 ORIG. REF: 001 OTH REF: 006

Card 2/2 egw

S/057/61/031/004/015/018
B125/B202

5.4130 (1273, 1228, 1043)

AUTHORS: Suyetin, P. Ye., Ivakin, B. A.

TITLE: Coefficients of mutual diffusion of some gases measured by the optical method

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 4, 1961, 499-501

TEXT: P. Ye. Suyetin, G. T. Shchegolev, R. A. Klestov (ZhTF, XXIX, 8, 1058, 1959) described methods of measuring the coefficients of mutual diffusion between gases and the apparatus. The present paper gives the results obtained with this apparatus and the objective "Industar-11" (focal length 75 cm). The theoretical values of the coefficients of reciprocal induction were calculated from formula

$$D_{12}=B\frac{T^{3/2}\left(\frac{M_1+M_2}{2M_1M_2}\right)^{1/2}}{P\sigma_{12}^2\Omega(T_{12}^*)(1-\Delta)}\cdot 10^{-4}, \qquad (1)$$

$$T_{12}^*=\frac{Tk}{\varepsilon_{12}}, \quad \varepsilon_{12}=\sqrt{\varepsilon_1\varepsilon_2}, \quad \sigma_{12}=\frac{1}{2}(\sigma_1+\sigma_2). \qquad (1)$$

Card 1/7

S/057/61/031/004/015/018
B125/B202

Coefficients of mutual diffusion ...

which is obtained from the rigorous kinetic theory. In this formula D_{12} denotes the coefficient of the mutual diffusion (cm^2/sec); T - the absolute temperature; k - the Boltzmann constant, M_1, M_2, σ_1, σ_2, ε_1, ε_2 the molecular weights, the collision diameters (Å) and the potential parameters (^oK) of the diffusing gases; $\Omega(T_{12}')$ the collision integral; Δ the correction of second approximation; B = 26.280 a constant coefficient. The quantities σ_1, σ_2, ε_1, ε_2 were calculated from analogous formulas for the viscosity coefficients of the pure components by using the experimental values of the viscosity coefficients and their temperature dependence. The theoretical values of the coefficients of mutual diffusion (column 9 of the Table) were calculated from the same Eq. (1), however, by using the empirical coefficient

$$B = 30.3 - 6.96\left[\frac{M_1 + M_2}{M_1 M_2}\right]^{1/2} \quad (2)$$

suggested by C. R. Wilke a. C. Y. Lee (Ind. Eng. Chem., 47, 6, 1255, 1955). Column 6 contains the experimental

Card 2/7

coefficients of the mutual diffusion as referred to standard conditions (p - 760 mm Hg, T - 273°K). Column 7 contains the experimental values obtained by various methods. The reduction of the results of the present study and also the results obtained by other authors led to formula $D_{012} = D_{12} \frac{P}{760} \left(\frac{273}{T}\right)^{3/2}$. The experiments were made with commercially pure gases. By purifying SF_6 the coefficient of the mutual diffusion was reduced by not more than 0.5%. Conclusions: the results obtained by the optical method of measurement are in good agreement with the results of the measurements made by other authors and other methods. The method of measurement described in the present paper permits the determination of the coefficient of mutual diffusion with high accuracy. This method is absolute and requires no calibration and no device for analysis. On the average, the theoretical results obtained deviate from the experimental results by 8% at the maximum. The theoretical values determined by the empirical coefficient B suggested by Wilke and Lee deviate from the experimental values by 5.5% at the maximum. Hence, this empirical coefficient permits a certain improvement of the accuracy of

Card 3/7

S/057/61/031/004/015/018
B125/B202

calculation of the coefficients of mutual diffusion. The accuracy of calculation can be increased by making the rules governing the interaction between the various molecules more precise. For this purpose, the temperature dependence of the coefficients of mutual diffusion must be further increased. There are 1 table and 6 references: 2 Soviet-bloc and 4 non-Soviet-bloc. The two most recent references to English-language publications read as follows: T. O. Hirschfelder, C. F. Curtiss, R. B. Bird, Molecular Theory of Gases and Liquids. New York, 1954. C. R. Wilke a. C. Y. Lee. Ind. Eng. Chem., 47, 6, 1255, 1955.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova Sverdlovsk (Ural Polytechnical Institute imeni S. M. Kirov Sverdlovsk)

SUBMITTED: May 3, 1960

IVAKIN, B.A.; SUYETIN, P.Ye.

Interdiffusion coefficients for certain gases measured by the optical method. Zhur. tekh. fiz. 33 no.8:1007-1010 Ag '63. (MIRA 16:11)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova, Sverdlovsk.

ACCESSION NR: AP4040319 S/0057/64/034/006/1115/1123

AUTHOR: Ivakin, B.A.; Suyetin, P.Ye.

TITLE: Investigation of the temperature dependence of the diffusion coefficients of gases

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.6, 1964, 1115-1123

TOPIC TAGS: diffusion, gas diffusion, temperature dependence, molecular interaction, air, argon, carbon monoxide, carbon dioxide, hydrogen, helium, nitrogen, sulfur compound

ABSTRACT: The diffusion coefficients of 18 pairs of gases were measured over the temperature range from 290 to 470°K by an optical method described elsewhere (P.Ye. Suyetin, G.T.Shchegolev and R.A.Klestov, ZhTF 29, No.8, 1959; P.Ye.Suyetin and B.A.Ivakin, Ibid.31, No.4, 1961; B.A.Ivakin and P.Ye.Suyetin, Ibid.33, No.8, 1963). The pairs investigated were He-air and all the combinations except A-CO, A-N_2 and CO-N_2 of the following gases: A, CO, CO_2, H_2, He, N_2 and SF_6. The apparatus was placed in a heavily constructed thermostatic chamber the temperature of which was controlled to ±0.1°C. A temperature difference of about 1°C was maintained between the top and

Card 1/3

ACCESSION NR: AP4040319

bottom of the apparatus to prevent convection. Each measurement was repeated 10 times, and the errors ranged between 1.5 and 2.5%. The results are tabulated. The Lennard-Jones potential, a modified Buckingham potential, and a simple power law repulsive potential were fitted to the diffusion coefficient data, and the parameters are tabulated for each pair of gases. The parameters describing the intermolecular potentials were also calculated from the potentials between like molecules obtained from viscosities or second virial coefficients. The usual averaging procedure was employed, in which the arithmetic mean of the ranges and the geometric mean of the potentials are taken. The forces between unlike molecules calculated in this way did not agree well with those obtained directly from the diffusion data. The diffusion coefficients were calculated from the intermolecular potentials for temperatures up to 1100°K for five pairs of gases for which the relevant experimental data are available. The values calculated from the intermolecular potentials obtained directly from the lower temperature diffusion data were in satisfactory agreement with experiment; those calculated from intermolecular potentials obtained by averaging the potentials for like molecule interactions were not. It is interesting that better agreement with experiment was obtained with the simple power law repulsive potential than with either the Lennard-Jones or the Buckingham potential. Orig.art.has: 11 formulas, 1 figure and 3 tables.

Card 2/3

ACCESSION NR: AP4040319

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute)

SUBMITTED: 19Nov63 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: ME, MP NR REF SOV: 003 OTHER: 003

Card 3/3

SUYETIN, P.Ye.; IVAKIN, B.A. (Sverdlovsk)

On a certain problem in three-component diffusion. Zhur. fiz. khim. 38 no.3:576-578 Mr '64. (MIRA 17:7)

1. Ural'skiy politekhnicheskiy institut.

IVAKIN, B.A.; SUYETIN, P.Ye.

Temperature dependence of the coefficients of interdiffusion of gases. Zhur. tekh. fiz. 34 no.6:1115-1123 Je '64.
(MIRA 17:9)

1. Ural'skiy politekhnicheskiy institut.

L 25520-66 EWT(1)

ACC NR: AP6011409 SOURCE CODE: UR/0057/66/036/003/0569/0570

AUTHOR: Fedorov, Ye.B.; Ivakin, B. A.; Suyetin, P. Ye.

ORG: Ural Polytechnic Institute im. S.M.Kirov, Sverdlovsk (Ural'skiy politekhnicheskiy institut)

TITLE: Measurement of the mutual diffusion constants of gases with an optical technique

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 3, 1966, 569-570

TOPIC TAGS: gas diffusion, helium, argon, air, krypton, fluorine compound, optic method

ABSTRACT: The apparatus for measuring gas diffusion constants by an optical technique, described elsewhere by P. Ye. Suyetin, G.T.Shchegolev, and R.A.Klestov (ZhTF, 29, No.6, 1959) and B.A.Ivakin and P.Ye.Suyetin (ZhTF, 34, No.6,1964), has been improved. The improvements, which are described briefly, will make it possible to measure diffusion constants with greater ease and accuracy than before, and at pressures far from atmospheric. The improved apparatus has been employed to measure the diffusion constants at room temperature and atmospheric pressure of the following pairs of gases: He-Ar, He-air, He-SF_6, He-Kr, H_2-Kr, and Ar-Kr. The results are tabulated and compared with the results of other investigators and with theoretical diffusion constants calculated

Card 1/2

UDC: 533.15

L 25520-66
ACC NR: AP6011409

with Lennard-Jones potentials derived from viscosity measurements. The present measurements are in good agreement with both the earlier measurements and the theoretical values. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20 SUBM DATE: 07Jul65 ORIG. REF: 002

Card 2/2

IVAKIN, B. I. PA 233T89

USSR/Geophysics - Earthquakes 1950

"Elastic Waves in One-Dimensional and Two-Dimensional Net Models of Continuous Media," B. I. Ivakin

"Trudy Geofiz Inst" No 9 (136), pp 84-121

Calculates absorption of elastic energy due to viscosity in the elastic elements (rubber) and to viscous friction of masses (loads) surrounded by circumambient medium (air). Acknowledges Prof Yu.V. Riznichenko's aid.

233T89

IVAKIN, B. N.

USSR/Geophysics - Seismography Sep/Oct 51

"Modeling of Seismic Waves," Yu. V. Riznichenko, B. N. Ivakin, V. R. Bugrov, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geofiz" No 5, pp 1-30

Discusses various methods for studying seismic wave phenomena under laboratory conditions. Describes exptl tests of the method based on application of elastic oscillations of ultrasonic frequency. This method allows one to obtain in the laboratory seismograms that are similar to those obtained of reflected or broken waves by multi-channel recording of earthquakes.

193T33

IVAKIN, B. N.

IVAKIN, B. N. - "Modeling of the Microstructure and Macrostructure of Waves in Heterogeneous Media." Sub 31 Dec 52, Geophysics Inst, Acad Sci USSR. (Dissertation for the Degree of Candidate in Physicomathematical Sciences).

SO: Vechernaya Moskva January-December 1952

USSR/Geophysics - Modeling of Seismic Waves May/Jun 52

"Modeling of Seismic Waves With the Aid of Ultrasonic Impulses," Yu. V. Riznichenko, B. N. Ivakin, V. R. Bugrov, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geogiz" No 3, pp 58-69

Describes an impulse ultrasonic device for modeling of seismic waves in application to problems of seismic prospecting and earthquake studies. Presents examples of works with this device: modeling of Lamb's 2-dimensional problem concerning propagation of waves in a solid elastic half space; modeling of 3-dimensional problem concerning propagation of head refracted waves connected with thin layers; detn

224T71

of elastic properties of solid and friable minerals in small-size samples of arbitrary shape (particularly measurement of velocities of propagation of longitudinal waves). Submitted 17 Dec 51.

224T71

IVAKIN, B.N.

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IVAKIN, B. N.

USSR/Geophysics - Seismoscope Jan/Feb 53

"Impulse Ultrasonic Seismoscope," Yu. V. Riznichenko, B. N. Ivakin, and V. R. Bugrov, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geofiz" No 1, pp 26-32

Describe construction and application of subject instrument for modeling seismic waves which are observed in seismic prospecting and in earthquake studies. State that the instrument is also used in detecting defects in building materials and in manufactured metal parts.

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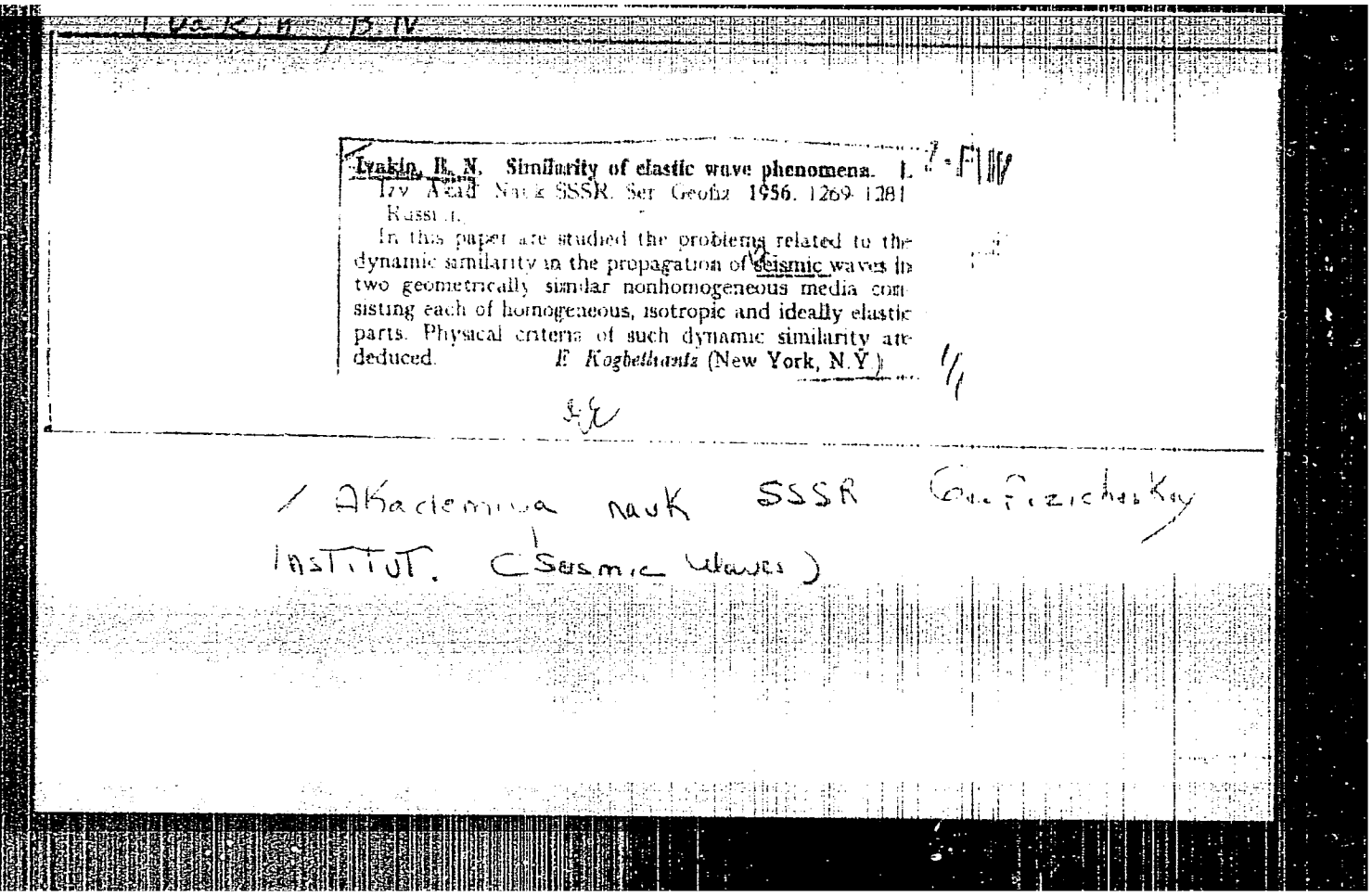

Ivakin, B. N. Similarity of elastic wave phenomena. I. Izv. Akad. Nauk SSSR. Ser. Geofiz. 1956, 1269–1281 (Russian).

In this paper are studied the problems related to the dynamic similarity in the propagation of seismic waves in two geometrically similar nonhomogeneous media consisting each of homogeneous, isotropic and ideally elastic parts. Physical criteria of such dynamic similarity are deduced. *F. Kogbetliantz* (New York, N.Y.)

Akademiya nauk SSSR Geofizicheskiy Institut. (Seismic Waves)

IVAKIN, B. N.

"Similarity of Elastic Wave Phenomena. II," by B. N. Ivakin, Institute of Physics of the Earth, Academy of Sciences USSR, Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, No 12, Dec 56, pp 1384-1388

On the basis of results presented in a previous article, the author obtains constants (multipliers) of similarity for stationary and nonstationary fields of displacement and mechanical tension. The obtained conditions (criteria and constants) of similarity are considered. The criteria of similarity for nonideally elastic mediums, when their coefficients of absorption and the laws governing the dispersion of diffusion speeds are known, are set forth.

The conditions obtained permit making a series of exact deductions concerning wave phenomena studied in models and similar wave phenomena in nature.

Sum 1258

IVAKIN, B.N.

Refraction, penetrating, and other waves in regard to a thin solid layer immersed in liquid. Trudy Geofiz.inst.no.35:88-115 '56.

(Seismic waves) (MLRA 10:1)

PHASE I BOOK EXPLOITATION 1109

Ivakin, B. N.

Mikrostruktura i makrostruktura uprugikh voln v odnomernykh nepreryvnykh neodnorodnykh sredakh (Microstructure and Macrostructure of Elastic Waves in One-dimensional Continuous Heterogeneous Media) Moscow, Izd-vo AN SSSR, 1958. 90 p. (Series: Akademiya nauk SSSR. Geofizicheskiy institut. Trudy, no. 39/166/) 2,700 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Geofizicheskiy institut.

Resp. Ed.: Riznichenko, Yu.V., Prof.; Ed. of Publishing House: Alekseyev, D.M.; Tech. Ed.: Pavlovskiy, A.A.

PURPOSE: This collection is intended for researchers in pure and applied seismology and for university students.

COVERAGE: The problem of a single spatial coordinate in the structure of elastic waves propagated in continuous, heterogeneous, absorbtive media is analysed. The study extends from a consideration of an infinitesimal interval

Card 1/3

Microstructure and Macrostructure (Cont.) 1109

comparable to the wave length (micro-structure) to intervals greater and very much greater than the wave length (macro-structure). Applying the principle of electrical lines and a quadripole source, the author introduces the concept of a differential constant for wave propagation. A solution is given for absorptive media with one and two boundaries and also for the case of periodically recurring layers. In all cases of the detailed micro- and macro-structure study of sinusoidal waves the velocity of propagation, pressure pulses, and intensity are determined, and the possibilities of a solution for media with gradually changing parameters are suggested. The text is accompanied by graphs. No personalities are mentioned. There are 30 references of which 28 are Soviet, 1 German, and 1 English.

TABLE OF CONTENTS:

Card 2/3

Card 3/3

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1-23-59

AUTHOR: Ivakin, B.N. SOV/49-58-7-2/16

TITLE: Modeling ... of Absorption of Seismic Waves (O modelirovanii pogloshcheniya seysmicheskikh voln)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya, 1958, Nr 7, pp 818 - 832 (USSR)

ABSTRACT: A complex phenomenon of the absorption of seismic waves in an elastic medium requires some new methods of determination. One of these is a laboratory method of modulation.
A physical macroscopic model of an elastic medium is the starting point of the calculations (Figure 1A). The model is composed of the mechanical resistances, i.e. "sides" Z^M_{10} and Z^M_{20}. The following equations can be derived from it: a) an equation of motion (1) being a function of the velocity of displacement or pressure with the coefficient of displacement expressed by the side resistance (2); b) an equation of the relationship (4) between the velocity of displacement and the pressure in a continuous model, which can be interpreted as a relationship between the displacements and the mechanical stresses in elastic medium (Hook's law).
To determine the electrical phenomena, a similar model

Cardl/10

(Figure 1B) is constructed and the similar equations applied (10-13). The values are changed accordingly: pressure is being substituted by tension, the velocity of displacement by electric current and the mechanical resistance by the electrical resistance. The media investigated are classified in the three different classes: 1) with elastic reaction (with elastic afterworking); 2) with strength due to internal friction; 3) in a state of residual deformation. The last two classes of the absorbing media could be considered as the particular cases of the first one.

Continuous Model of a Medium with Elastic Reaction (afterworking).

To employ the method of a continuous model of absorbing elastic medium, the equations of motion which determine the medium with reaction should be defined. Two equations are applied.

A function (14) related to the normal stresses in the medium and the equation of motion (15) for a longitudinal wave moving along the co-ordinate X can be considered. In

order to adapt the equation (15) to the model, its integro-differential form should be changed into a differential equation (16) through differentiating in respect of t . After eliminating the similar integrals from (15) and (16), the equation (17) is formed. It is also differentiated in respect of t so that the functions u(x, t) and v(x, t) with the equation (18) are obtained. The latter can be presented in more practical form by use of Laplace transformation in order to form a differential equation of the second order (19), where an operator p is considered as a parameter of the function v(p, x). The Eq.(19) can be written as Eq.(20). By substituting (20) into (1), a basic equation (21) is being found which expresses the parameters related to the side resistance of the model.

A second basic equation is required for determining the value of resistance. It should express the relation between parameters of the absorbing medium and the resistance. An assumption is made that the absorption of the medium depends on its elasticity and that the density (mass) of the medium is independent of its absorption. In this case, the

 resistance of the parallel side of the model should be equal

to the inertia resistance of an elastic medium (22) - where M_o is the linear density of the mechanical model. Substituting Z_{10}^M from Eq.(22), into Eq.(21), the value of resistance (23) is found. The resistance of the absorbing medium (23a) is obtained by substituting (22) and (23) into (4).

In a particular case when the absorption of the elastic medium is characterised by elasticity and inertia, the two resistances Z_{10}^M and Z_{20}^M become the complex functions of the Heaviside's operator and their determination requires an additional equation expressing the wave resistance. The Eq.(23) can be presented in the form (24). The resistance Z_{20}^M can only be elastic with reaction of the type $Z_K = K/P$ and $Z_H = H$. Therefore, the Eq.(24) can be written as Eq.(25) with the resistances specified in (26) and the coefficients of elasticity in Eq.(27).

A construction of the resistance Z_{20}^M is based on the

Formula (25) where the resistance Z_K and H are added in parallel (or in series in the electric model). The total resistance of the side Z^M_{20} is obtained by adding the reciprocal values of the sum of conductivity $1/Z_{K_o}$ and $1/Z_K - H$. As an example, a model of the elastic medium with reaction is shown in Figure 2 (A - mech., B - electr.). There is another way to calculate the resistance Z^M_{20} (or its electric equivalent Z^E_{20}) by means of a differently constructed model. For this reason, the Eq.(23) is transformed into a series of fractions being considered as a function (30). Thus, a different equation for Z^E_{20} is obtained (31) with parameters (32) and the resistance coefficients having the new values (33). The relation between the previous and new parameters can be calculated from (34, mech.) and (35, electr.).

A construction of the new mechanical and electrical models, as defined by Eq.(31) is shown in Figure 3. This second

model of the medium with elastic reaction actually does not differ much from the first one (Figure 2), i.e. the equations of motion, as defined for the first and second models are analogous - the coefficients only will differ. The equation of motion (36) for the first mechanical model (Figure 2A) is found from the Formulae (1) and (2). The same (37) is applied for the electric model (Figure 2B). The Eqs.(36) and (37) are equal to (18) if the coefficients (28) or (29) are taken into account. Therefore, by an application of the above models with their respective limiting conditions, a modulation of absorption of the seismic waves in the elastic medium with reaction can be defined.

The equation of motion for the second mechanical (or electric) model (Figure 3) can be determined by an analogous calculation of the model itself or through an exchange of the coefficients in (36) with consideration of (28) and (34). It is simpler, however, to use the first model (28), (29). The wave resistance (38) for the model (Figure 2A) can be derived from (22) and (23) substituted into (4). Similarly is obtained the Eq.(39) for the electric model.

Continuous Model of Visco-elastic Medium

The above method can be applied in the case of a medium being of visco-elastic nature. The equation of motion for the longitudinal wave moving along the co-ordinate X will be (40). By differentiating it in respect of t and considering the velocity of particle dislocation $V = \partial u/\partial t$, the Eq. (41) is obtained. It can be written as Eq.(42). From Eqs.(42) and (1) an equation (43) is found which is the first basic equation needed for defining sides Z^M_{10} and Z^M_{20} of the model of medium with the visco-elastic parameters. As before, an assumption is made that the density of medium is not related to the absorption and that absorption depends only on elasticity. This condition gives the second basic equation (44). From Eqs.(43) and (44), the value of resistance (45) is calculated with the resistance Z or H given by Eq.(46) and the parameters described by Eq.(47). The construction of the mechanical model is based on Eq.(45). As an example, a model (Figure 4, A-mech., B-electr.) is constructed with the values given in Eq.(48).

The equations of motion for the mechanical (49) and electrical (50) models (Figure 4) are found as before from the values of side resistance and from the Eq.(1). They are similar to (40). Thus, these models can represent the modeling of the absorption of elastic waves in the viscous medium.

The visco-elastic medium can be considered as a particular case of the elastic medium with reaction expressed by Eqs. (15) and (18). Also, when the resistance Z_{10} and Z_{20} of the visco-elastic medium is known, the wave resistance can be determined from Eqs.(4) and (12), thus forming the Eqs.(53) to (55).

Continuous Model of Elastic Medium With Residual Deformations.

For the seismographic and seismosurvey purposes, it is important to know the absorption of waves in the medium of residual deformation found in the shallow layers of the Earth's core. This can be done simply by constructing a Maxwell's model of elastic medium (Figure 5, A-mech., B-electr.).

Card8/10 The required equations of motion (56) and (57) are derived

Modeling of Absorption of Seismic Waves

from the Formulae (1), (2) and (10), (11). To apply the model (Figure 5), the limiting value $K_p \to 0$ ($C_p \to \infty$ electr.) should be changed into $K_p = \lambda_B + 2\mu_B \to 0$ and the equations of motion (36), (37) become (56), (57). The relationships (58) and 58a) between the parameters of the medium and the model are found in Eqs.(28) and (47). The equation of motion (59) is obtained from Eq.(52) with limiting case $\lambda_B + 2\mu_B \to 0$ or from Eq.(56) with parameters (58).

The wave resistance (60) of both, the mechanical model and the medium can be determined from Eq.(4) with the parameters (58). As before, an assumption is made of the medium being in the state of ideal inertia.

The three cases of elasticity described above do not represent all the possibilities of the real conditions (i.e. the various combinations of the three media). However, the calculations of these possibilities can be easily carried out along the lines described in this work.

Card9/10